

Option #1
Regional Model

VIRGINIA WATER CONTROL BOARD

MEMORANDUM

SUBJECT: Proposed Effluent Limits for Simmons Truck Terminal,
Discharge to An Unnamed Tributary to Roanoke River (Lake
Gaston), Mecklenburg County, Roanoke River Basin

TO: Curt Linderman via Golam Mustafa

FROM: D. X. Ren

DATE: February 12, 1992

Copies: File

Purpose of Study:

The Simmons Truck Terminal (VA00636314) submitted a request for increasing the discharge flow from current 0.0043 MGD to 0.016 MGD to the unnamed tributary to the Roanoke River (Lake Gaston). The owner proposed to replace the existing lagoon with a package treatment plant. This resulted in the modeling efforts for the subject discharge.

The subject discharge was not addressed in the Roanoke River Basin WQMP. The permit modeling efforts were made in 1978 by K.C. Das. The receiving stream section: 1, Class: III, Special standards: PWS'e. The subject stream was designated as the water quality limit segment in the Roanoke River Basin WQMP. The Waterbody Code: VAP03010106-011.

The current effluent limits exist in the active permit for the subject discharge (VA0063614) as follows:

Simmons Truck Terminal STP

 $\bar{Q} = 0.0043$ MGD
 $BOD_5 = 30.0$ mg/l
(0.488 kg/d or 1.08 lbs/d)
 $BOD^u/BOD_5 = 1.75$
 $TSS^u = 60$ mg/l
 $DO = 1.0$ mg/l

In May 1988, the Tanglewood Realty proposed a discharge for a planning motel and restaurant with the flow 0.04 MGD at 0.7 mile downstream of the Simmons Truck Terminal. The permit (VA0078654) was issued in on August 11, 1988. The proposed discharge runs 0.2 mile to the Lake Gaston directly. The effluent limits ($\bar{Q} = 0.04$ MGD, $BOD_5 = 30.0$ mg/l, $BOD^u/BOD_5 = 2.5$, $DO = 5.0$ mg/l, $TKN = 17$ mg/l for summer only). The effluent limits were approved by the headquarter on May 23, 1988. However the proposed Tanglewood Motel never been built since then.

Proposed Effluent Limits for Simmons Truck terminal

This memo is to propose the effluent limits for the increased discharge flow 0.016 MGD based on the steady state Model.

Site Inspection:

The site inspection was conducted by me on January 30, 1992. It indicated that the Tanglewood Motel and restaurant which was proposed in 1988 never been built yet. Currently only one discharge exists in this unnamed tributary. Also the existing lagoon for the Simmons Truck terminal didn't perform very well. The high level of Algae was visible during my site inspection. The DO saturation percentage ranged from 44.1-66.7 % at the receiving stream. The background DO saturation percentage for the upstream of the short segment in the winter was 62.2 %. The detail results was tabilized as attached. During my site inspection, the assistant manager, Mr. Tommy Walker (804-629-2221), was present.

7Q10 Flow Estimates:

The receiving stream is an intermittent stream. According to the updated USGS gauge information, the nearest reference gauge is 02079640 Allen creek near Boydton:

Gauge Drainage Area : 53.4 sq.mi.
Gauge 7Q10 : 0.03 cfs
Drainage Area above discharge point:
0.086 sq.mi.

Therefore, the 7Q10 at discharge site was 0.00005 MGD. It rounds to zero MGD.

Modeling Approach:

The discharge ($Q=0.0043$ MGD) was modeled using Streeter-Phelps Model (Monroe version) in 1978.

To generate the purposed effluent limits for the increased discharge flow ($Q=0.0016$ MGD), the Regional Model (version 3.2, September 1990) was used. The model was run for two segments. Due to the valid permit for the Tanglewood Realty Motel and Restaurant until August 1993, the discharge was included in this model efforts.

Antidegradation Policy:

Due to the intermittent stream, the antidegradation policy was not applied in the model.

Modeling Results:

The following effluent limits are proposed for this case:

Simmons Truck Terminal STP

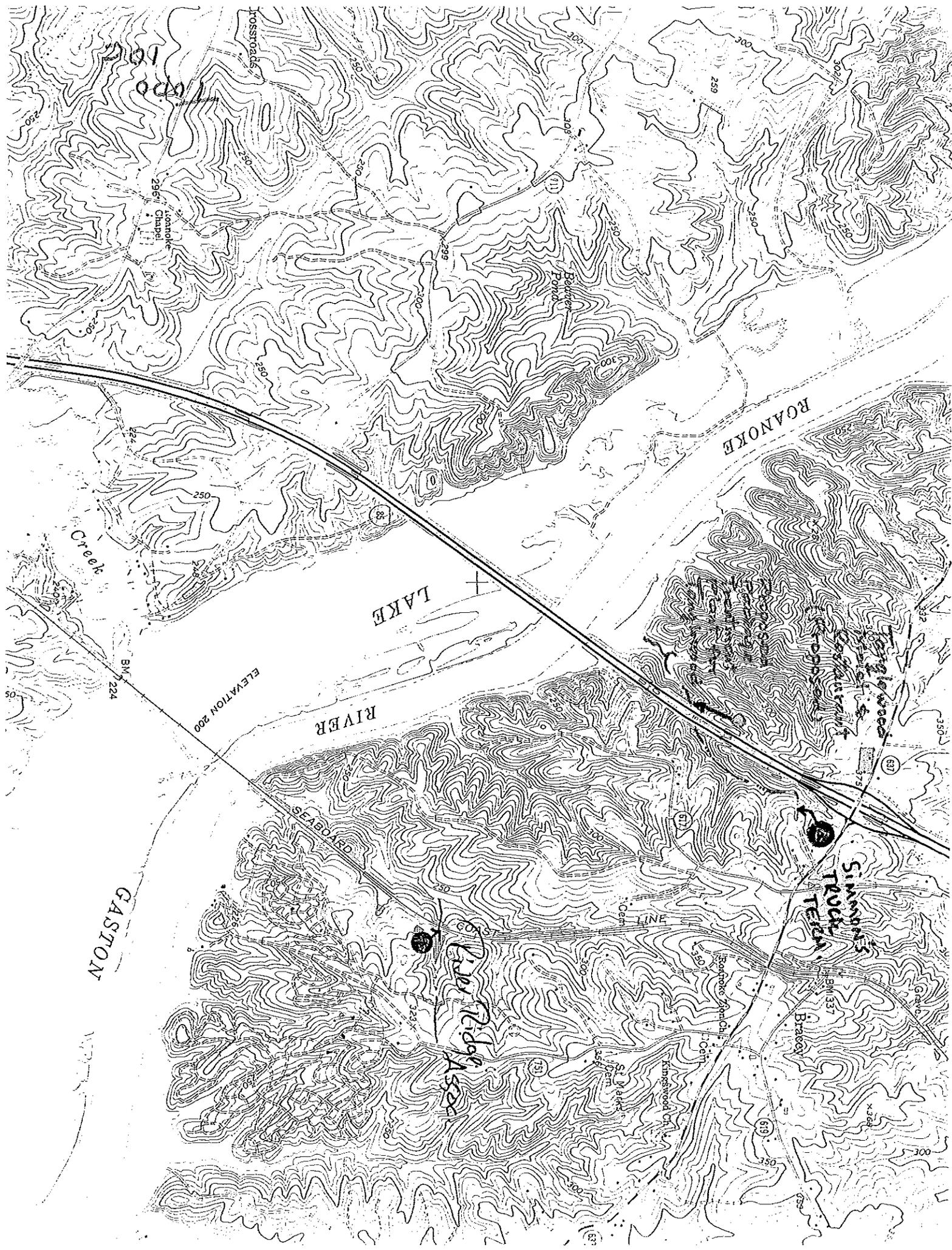
 $Q = 0.016$ MGD
 $CBOD_5 = 16$ mg/l
 $CBOD_5/CBOD_u = 2.5$
 $TKN = 3.0$ mg/l
 $DO = 6.5$ mg/l
Critical Temp. = $28.0^\circ C$

It is noted that Ammonia concentration for the toxicity concerns will be addressed separately. In this case, the Ammonia Nitrogen concentration is a control factor @ $7\%10 = 0$ cfs condition. The included TKN limit is assumed to match the Ammonia concentration required.

Also it is noted that the effluent limits for the Tanglewood Realty need to be modified once permit reopen or reissuance. Based on new model, the effluent limits will be: $Q = 0.04$ MGD, $CBOD_5 = 22.0$ mg/l, TKN = 3.0 mg/l, $DO = 6.5$ mg/l. As it was mentioned before, this facility was not built yet.

The computer printout, copy of topographic map, and schematic showing the discharge points are attached for your reference.

If you have any questions, please let me know.



Reference Option #2
(Steady State Model)

VIRGINIA WATER CONTROL BOARD

MEMORANDUM

SUBJECT: Proposed Effluent Limits for Simmons Truck Terminal,
Discharge to An Unnamed Tributary to Roanoke River (Lake
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TO: Curt Linderman via Golam Mustafa

FROM: D. X. Ren

DATE: February 12, 1992

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Purpose of Study:

The Simmons Truck Terminal (VA00636314) submitted a request for
increasing the discharge flow from current 0.0043 MGD to 0.016 MGD to
the unnamed tributary to the Roanoke River (Lake Gaston). The owner
proposed to replace the existing lagoon with a package treatment plant.
This resulted in the modeling efforts for the subject discharge.

The subject discharge was not addressed in the Roanoke River Basin
WQMP. The permit modeling efforts were made in 1978 by K.C. Das. The
receiving stream section: I, Class: III, special standards: PWS'e. The
subject stream was designated as the water quality limit segment in the
Roanoke River Basin WQMP. The waterbody code: VAP03010106-01L.

The current effluent limits exist in the active permit for the subject
discharge (VA0063614) as follows:

Simmons Truck Terminal STP

Q = 0.0043 MGD
BOD₅ = 30.0 mg/l
(0.488 kg/d or 1.08 lbs/d)
BOD₅/BOD₅ = 1.75
TSS_u = 60 mg/l
DO = 1.0 mg/l

In May 1988, the Tanglewood Realty proposed a discharge for a planning
motel and restaurant with the flow 0.04 MGD at 0.7 mile downstream of
the Simmons Truck terminal. The permit (VA0078654) was issued in on
August 11, 1988. The proposed discharge runs 0.2 mile to the Lake
Gaston directly. The effluent limits (Q = 0.04 MGD, BOD₅ = 30.0 mg/l,
BOD₅/BOD₅ = 2.5, DO = 5.0 mg/l, TKN = 17 mg/l for summer only). The
effluent limits were approved by the headquarter on May 23, 1988.
However the proposed Tanglewood Motel never been built since then.

Proposed Effluent Limits for Simmons Truck terminal

This memo is to propose the effluent limits for the increased discharge flow 0.016 MGD based on the steady state Model.

Site Inspection:

The site inspection was conducted by me on January 30, 1992. It indicated that the Tanglewood Motel and restaurant which was proposed in 1988 never been built yet. Currently only one discharge exists in this unnamed tributary. Also the existing lagoon for the Simmons Truck terminal didn't perform very well. The high level of Algae was visible during my site inspection. The DO saturation percentage ranged from 44.1-66.7 % at the receiving stream. The background DO saturation percentage for the upstream of the short segment in the winter was 62.2 %. The detail results was tabilized as attached. During my site inspection, the assistant manager, Mr. Tommy Walker (804-629-2221), was present.

7010 Flow Estimates:

The receiving stream is an intermittent stream. According to the updated USGS gauge information, the nearest reference gauge is 02079640 Allen Creek near Boydton:

Gauge Drainage Area : 53.4 sq.m.l.

Gauge 7010 : 0.03 cfs

Drainage Area above discharge point:

0.086 sq.m.l.

Therefore, the 7010 at discharge site was 0.00005 MGD. It rounds to zero MGD.

Modeling Approach:

The discharge ($Q=0.0043$ MGD) was modeled using Streeter-Phelps Model (Monroe version) in 1978.

To generate the purposed effluent limits for the increased discharge flow ($Q=0.0016$ MGD), the steady state Model (Dale Phillips version) was used. The model was run for two segments. Due to the valid permit for the Tanglewood Realty Motel and Restaurant until August 1993, the discharge was included in this model efforts. The following assumptions were made for the model: Background DO saturation⁻¹. The percentage = 62 %, $BOD_u/BOD_5=1.75$, $K_1=1.2$ day⁻¹, $K_n=0.35$ day⁻¹. The NBD was considered in the new model approach.

Antidegradation Policy:

Due to the intermittent stream, the antidegradation policy was not applied in the model.

Modeling Results:

The following effluent limits are proposed for this case:

Simmons Truck Terminal STP

Q = 0.016 MGD
CBOD₅ = 25.0 mg/l
CBOD₅/CBOD_u = 1.75
TKN = 3.0 mg/l
DO = 6.5 mg/l
Critical Temp. = 28.0°C

It is noted that Ammonia concentration for the toxicity concerns will be addressed separately. In this case, the Ammonia Nitrogen concentration is a control factor @ 7010 = 0 cfs condition. The included TKN limit is assumed to match the Ammonia concentration required.

Also it is noted that the effluent limits for the Tanglewood Realty need to be modified once permit reopen or reinsurance. The new effluent limits are: Q = 0.04 MGD, CBOD₅ = 28 mg/l, CBOD_u/CBOD₅ = 2.5, TKN = 3.0 mg/l, DO = 6.5 mg/l. As it was mentioned before this facility was not built yet.

On February 11, 1992, Dale Phillips of OWRM approved the model. The computer printout, copy of topographic map, and schematic showing the discharge points are attached for your reference. If you have any questions, please let me know.